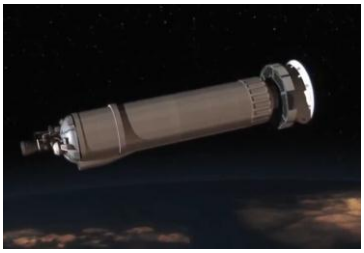


Centaur 50th Anniversary Engineering Design Challenge "Pushing the Limits"

Engineering Design Process

The engineering design process involves a series of steps that lead to the development of a new product or system. In this design challenge, students are to complete each step and document their work as they design their air-propelled Centaur vehicle. The students should be able to do the following:

STEP 1: Identify the Problem -- Students should state the challenge problem in their own words. Example: How can I design a _____ that will _____?

STEP 2: Identify Criteria and Constraints -- Students should specify the design requirements (criteria).What needs to be included: What are specifications or rules that the design has to abide to. Students should list the limitations of the design due to available resources and the environment (constraints).

STEP 3: Brainstorm Possible Solutions -- Each student in the group should sketch his or her own ideas as the group discusses ways to solve the problem. Labels and arrows should be included to identify parts and how they might move. These drawings should be quick and brief.

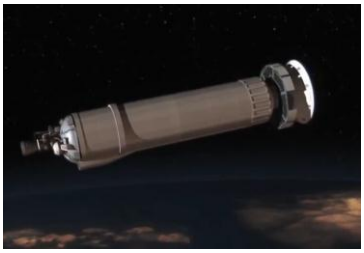
STEP 4: Select a Design -- Students will share their designs within their group and discuss positive and negative aspects of each. They will choose a design to begin, possibly implementing aspects of several designs into one.

STEP 5: Build a Model or Prototype -- Students will construct a full-size or scale model based on their selected designs. The teacher will help identify and acquire appropriate modeling materials and tools.

STEP 6: Test the Model and Evaluate -- Students will repeatedly test their solution in a controlled test environment. They will take measurements and observations regarding each test and begin to consider modifications that may address any issues with the design that arise while testing. (Use Student Data Sheet)

STEP 7: Refine the Design -- Students will examine and evaluate their prototypes or designs based on the criteria and constraints given in the challenge rules. Groups may enlist students from other groups to review the solution and help identify changes that need to be made. Based on criteria and constraints, teams must identify any secondary problems and proposed solutions.

STEP 8: Share the Solution -- Students will demonstrate their solution in a tri-fold poster presentation and within the classroom that will allow them to show knowledge and skills gained from utilizing the engineering design process to solve the initial problem.



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